In general, no special precautions are necessary for patients who have received tracer doses of radioactive material for nuclear medicine diagnostic studies. The amount of radioactive material use is small, producing little radiation outside the patient's body. If urine or stool samples are required from these patients, universal body substance precautions will also be effective in controlling radioactive material contamination.

One form of radiation therapy, called radiopharmaceutical therapy, utilizes radioactive materials in unsealed liquid form. The liquid is administered to the patient by injection or ingestion. Since the radioactive material is incorporated in body fluids, universal body substance precautions are necessary to reduce the chance of radioactive material contamination. In addition to the contamination concern, radiopharmaceutical therapy patients can produce a measurable gamma radiation field at some distance from their body. Measures need to be taken to reduce the time spent with these patients and to perform necessary duties at the maximum possible separation.

Some patients also are treated for cancer by implanting small sealed radiation sources in the tumor. The only concern in caring for these patients is protecting oneself from the external radiation field. Nursing personnel are to complete tasks in an orderly, efficient manner, spending only as much time in the room as is necessary for the patient's physical and emotional well-being. The radiation exposure to people entering the patient's room will be small as long as time spent in the room is not excessive.

All patient rooms where significant radiation levels are present will be identified by a sign on the door bearing the words "Radiation" and the three-bladed radiation symbol. Contact the nurse in charge for specific instructions before entering the room. The Hospital Health Physicist is also available if any questions are not answered to your satisfaction.

Radiation Safety During Nursing Care

The Radiation Safety Office staff is available to assist the nursing and medical staff in keeping the hazards of exposure to radiation to a minimum, and to assist with any problems. The Hospital Health physicist will normally be aware that a patient is to receive a therapeutic dose of radioactive material. Notifying the Radiation Safety Office at 3-3190 will assure that the proper surveillance is scheduled during the period of treatment. When the patient is discharged, it is important that the room is cleared by Radiation Safety and the Radiation Oncology physician before it is assigned for reoccupancy.

General Principles

A. Hazards increase with increased dosage levels of radionuclides.
B. Hazards of radioactive material arise from three sources:
   1. Contamination of the skin
   2. Incorporation in the body through ingestion, inhalation, or injection
   3. External exposure from radioactive material in the patient's body

C. Skin contamination, ingestion, and inhalation are prevented to a large extent by practicing good personal hygiene.

D. External irradiation is reduced by minimizing close contact with patients who have received therapeutic doses of radioactivity. Time and distance determine the exposure. (A dose rate of 100 mR/hr at one foot from the patient will be only 4mR/hr at five feet from the patient.)

E. Equipment, patient's rooms work areas, and personnel should always be monitored with proper radiation instruments anytime contamination is suspected, and after every radioactive material therapy patient. (Call the Hospital Health Physicist, 3.3190.)

F. No special precautions are required for patients who receive small amounts of radioactive material for diagnostic tests, i.e., bone scans, gallium scan.

G. Special precautions described below are necessary when therapeutic doses of unsealed radioactivity are administered to patients.

H. Patients receiving radiation therapy from sealed radioactive sources implanted in their tumors do not pose any contamination hazard. Needed precautions are limited to external exposure reduction techniques.

I. Radiation doses to nursing personnel remain well below the levels allowable to anyone in the general public. However, individuals on nursing units caring for a large number of treated patients will be assigned dosimeters to assure low personnel exposure, and to alert radiation safety staff of potential problems.

J. Washington Administrative Code restricts radiation exposure in areas adjoining a patient treated with radioactive materials to 2 millirem in an hour. Since most treatments last about two days, 2 millirem per hour is the maximum exposure rate allowed in adjoining areas (2 mrem/hr x 48 hrs = 96 mrem). When the treatment time is extended or more than one patient is treated in a given room in less than seven days, the allowable exposure rate in adjoining areas may be less than 2 millirem per hour. In any event, measures must be taken to limit radiation exposure in adjoining areas. This may often necessitate "blocking" an adjacent room, since it would be unacceptable for patient occupancy.

K. Nursing duties should be performed quickly, but with consideration for the patient's needs and concerns.
A. Obtain bedside radiation shield from Materials Management. (Room does not need to be taped up)

B. Lead lined rooms on 6SE or 6NE are required for these patients.

C. Bed preparation:
   2. Iridium Pelvic Implants: with "Syed-Nebleft" (peritonea implants, use Foster frame cushions with geri pads underneath the space between cushions.
   3. For other implant sites, a regular hospital bed is adequate.

D. After sources are loaded in the surgically implanted loading devices:
   1. Position the special shield at the patient's bedside between the patient and the door. Place all equipment, i.e. IV pole, Foley catheter and other nursing equipment on the side of the bed closest to the door to minimize exposure.
   2. Post the radioactive material sign and precaution list at the room entrance.
   3. Soon after loading, the patient will be monitored by Radiation Safety staff. Radiation zones are recorded on a room map that is posted at the room entrance. (see Brachytherapy Patient Survey Procedure).
   4. Place all used linens in a laundry bag kept in the room until cleared by the Radiation Surveyor or Radiation Oncology physician.
   5. No pregnant visitors or staff or persons under 18 in the room.
   6. Visitors will be limited to one hour per day and encouraged to stay at least six feet from the patient as much as possible.
   7. In situations requiring extended patient monitoring by visitors or staff (uncooperative, incapable, or incoherent patient), direct care time should be minimized and observational care should be performed at the maximum possible distance.
8. Never touch the capsules or seeds containing radioactive materials. If a suspected source becomes dislodged, use long-handled forceps and put in a corner of the room. Call Radiation Oncology or Radiation Safety (Hospital Health Physicist at 3-3190).

9. Patient and room should be surveyed by the Radiation Oncology physician or Radiation Safety staff prior to discharge and room reassignment for Cesium-137 implant patients.

10. The patient and room exit survey must be performed by Radiation Safety staff for Iridium-192 implant patients. In certain situations, a Radiation Oncology physician will be designated to perform the exit survey after they have been provided with a sensitive survey instrument by Radiation Safety.

11. Patient and room survey should be noted in the patient's chart and the yellow room survey form posted at the patient's door. The survey form should be returned to Radiation Safety, Box 354400.

12. Direct any safety questions to Hospital Health Physicist, 543-3190.
FOSTER FRAME CUSHION SET-UP FOR PATIENTS WITH A SEED IMPLANT

<table>
<thead>
<tr>
<th>1 papa cushion</th>
<th>1 papa cushion</th>
<th>1 mama cushion</th>
<th>1 mama cushion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>space</td>
<td>3</td>
</tr>
</tbody>
</table>

↔4 babies placed to leave a space in the middle (the implant fits in this space)

A draw sheet is placed over the 2 papa cushions to hold them in place. A separate draw sheet is placed over the 2 mama cushions and blue chux plus a draw sheet are used to cover the 4 babies, leaving the indented space. The finished bed will look something like this...
A. Patient's room requires no special preparation.

B. External radiation exposure levels are minimal and require no special precautions while caring for patient.

C. If Radiation Oncology physician suspects the bladder or intestines may have been punctured, he/she will request that all urine be saved. This material must be monitored by Radiation Safety personnel prior to disposal.
A. A Radiation Safety Office (RSO) staff member will obtain from the patient care coordinator the names of expected implant patients and the physicians responsible for their treatment.

B. The RSO staff member will contact the physicians and request information on the anticipated time and amount of loading and any unusual circumstances that may require greater than normal nursing care. Special precautions will be discussed with Nursing and Environmental Services personnel.

C. Patient room exposure rate diagram:

   i. If the patient is loaded during normal working hours (9-1730), a room survey will be performed by Radiation Safety personnel soon after the sources are in place. A survey form will be posted at the entrance to the room showing approximate exposure rate levels around the bed.

   ii. If the loading is scheduled for other than normal working hours, an estimated exposure rate diagram will be constructed by Radiation Safety personnel using the information obtained from the physician. This diagram should be marked as "estimated" and placed on the entrance to the patient's room. The day after the loading, a physical survey of the room should be performed to verify the exposure rates and the revised diagram will be posted at the room entrance.

D. At the time of the physical room survey, the Radiation Safety Office personnel will enter the exposure rate at one meter from the patient, their signature, and the date and time of the survey in the "Progress Notes" section of the patient's chart. Pertinent safety precautions will also be indicated and discussed with the nurses and/or Environmental Services staff.

E. The Radiation Oncology physician may do the patient and room clearance survey. For Cs-137 and Ir-192 patients, the RSO staff will do a follow-up check of the patient and room. The person doing the clearance survey will enter the results on the bottom of the form posted at the room entrance, and should note similar information on the "Progress Notes" form in the patient's chart. The room diagram form will be retained for RSO records by the Nurse Manager.
RADIATION ROOM SURVEY

This survey form is to remain in the room until removed by Radiation Safety staff. If you have any questions, call the Hospital Health Physicist at 543-3190.

Patient Name _______________________________  Date _______________________________
Room No. _______________________________  Loading/Dose _______________________________ mCi
Physician(s) _______________________________  _______________________________ mg Ra Eq
Radionuclide _______________________________  Admin/Implant Date _______________________________
Chemical/Physical Form _______________________________  Discharge/Removal Date _______________________________

VISITOR

The following zones will tell you where to be in the room and how long to stay.

<table>
<thead>
<tr>
<th>Zone</th>
<th>Maximum Time</th>
<th>Radiation Exposure Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td></td>
<td>&gt; 100 mR/hr</td>
</tr>
<tr>
<td>II</td>
<td>1 hour/week</td>
<td>10 mR/hr to 100 mR/hr</td>
</tr>
<tr>
<td>III</td>
<td>10 hours/week</td>
<td>2.5 mR/hr to 10 mR/hr</td>
</tr>
<tr>
<td>IV</td>
<td>No Time Limit</td>
<td>1 mR/hr to 2.5 mR/hr</td>
</tr>
<tr>
<td>V</td>
<td>No Time Limit</td>
<td>&lt; 1 mR/hr</td>
</tr>
</tbody>
</table>

HOSPITAL STAFF

Classifications of radiation exposure to hospital staff, read at 1 meter from patient.

- Low  Less than 5 mR/hr
- Medium  5 to 20 mR/hr
- High  > 20 mR/hr

RADIATION SAFETY STAFF

Comments:

- Yes  No  Patient surveyed and sources removed.  ________ Initials
  OR
- Yes  No  Room is free of radioactive contamination.  ________ Initials

Surveyed By:  Title:  Date:

UW  EH&S  Radiation Safety Office  Box 354400  201 Hall Health  Seattle WA  98195  206-543-0463